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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/963,915	09/26/2001	John F. Barrett	MMO-10002/38	9416

7590 11/25/2003

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EXAMINER

KERSHTEYN, IGOR

ART UNIT	PAPER NUMBER
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3745

DATE MAILED: 11/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/963,915

Applicant(s)

BARRETT, JOHN F.

Examiner

Igor Kershteyn

Art Unit

3745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☒ Claim(s) 7 is/are objected to.
- 8) ☒ Claim(s) 8-15 are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 September 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Drawings*

New corrected drawings are required in this application because

In figure 2, the legends in the boxes and numerals are not readable,

In figure 3, the numerals for components are missing, and components in figure 3 appear too small which makes it hard to understand the structure. Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mangyo et al. (5,252,039) in view of Oda et al. (4,798,493) in view of Japan Patent No. 57-79277.

Mangyo et al. teach a submersible gas compressor comprising a high pressure piston 35 in contact with a bore 36, a crank 25 in mechanical connection with said piston 35, a thermal immersion tank (bottom of container 20) comprising a liquid heat

Art Unit: 3745

transfer fluid 33 (**Note.** Lubricating fluids are known to transfer or somewhat to remove heat from moving parts), wherein the crank 25 has a double hung shaft 28 operating independent of cantilever motion, wherein the reciprocating movement of said drive piston cycles between 600 and 800 cycles per minute (inherently).

Mangyo et al. teach all the claimed subject matter except that they don't teach the drive piston mounted to the ceramic high pressure piston such that movement of the drive piston simultaneously moves the ceramic high pressure piston further comprising a compliant coupling between said ceramic high pressure piston and said drive piston.

Oda et al, in figure 5, teach the drive piston 25 mounted to the ceramic high pressure piston 21 such that movement of the drive piston 25 simultaneously moves the ceramic high pressure piston 21 further comprising a compliant coupling 22,23,24 between said ceramic high pressure piston 21 and said drive piston 24.

Since Mangyo et al. and Oda et al. are analogous art because they are from the same field of endeavor, that is the reciprocating piston pump art, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the compressor of Mangyo et al. with the composite piston as taught by Oda et al. for the purpose of reducing frictional losses between the piston and the cylinder.

Mangyo et al. as modified by Oda et al. teach all the claimed subject matter except that they don't teach the ceramic high pressure piston in contact with a ceramic sleeve.

Art Unit: 3745

Japan Patent in figures 1 and 2, teaches a reciprocating compressor having the ceramic high pressure piston 13 in contact with a ceramic sleeve 14.

Since Mangyo et al. as modified by Oda et al. and Japan Patent are analogous art because they are from the same field of endeavor, that is the reciprocating compressor art, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the compressor of Mangyo et al. as modified by Oda et al. with the ceramic liner as taught by Japan Patent for the purpose of further reducing frictional losses between the piston and the cylinder.

#### ***Allowable Subject Matter***

Claim 8 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### ***Prior Art***

Prior art made of record but not relied upon is considered pertinent to Applicant's disclosure and consist of four patents.

Holland (4,539,818) is cited to show a reciprocating compressor having a ceramic liner and a piston having a ceramic sleeve but fails to teach a ceramic piston mounted to a drive piston.

Art Unit: 3745

Kawamura (4,864,987) is cited to show a ceramic piston in contact with a ceramic liner, wherein the ceramic piston is mounted to a drive piston, but fails to teach the use of the above combination for the reciprocating compressors.

Salzman (5,186,137) is cited to show a reciprocating machine having a ceramic coated cylinder liner a ceramic coated piston.

German Patent 3437999 is cited to show a ceramic cylinder liner for reciprocating piston compressor.

***Contact information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Kershteyn whose telephone number is (703) 308 8317. The examiner can be reached on Monday-Friday from 8:00 a.m. to 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Look, can be reached on (703) 308 1044. The fax number is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308 0861.

IK

November 17, 2003



**Igor Kershteyn  
Patent examiner.  
Art Unit 3745**



**EDWARD K. LOOK  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 3700**

11/22/03